



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
08/627,386	04/04/1996	GUNTER BAUR	MERCK-1753-D	8932
23599 7590 07/18/2006				
MILLEN, WHITE, ZELANO & BRANIGAN, P.C.				
2200 CLARENDON BLVD.				
SUITE 1400				
ARLINGTON, VA 22201				
EXAMINER				
SCHECHTER, ANDREW M				
ART UNIT		PAPER NUMBER		
2871				

DATE MAILED: 07/18/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

08/627,386

Applicant(s)

BAUR ET AL.

Examiner

Andrew Schechter

Art Unit

2871

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
 - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
 - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 October 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 20-35, 37-85, 88-90 and 97-124 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 63-67 is/are allowed.
- 6) ☒ Claim(s) 20-32, 34, 35, 37, 39-62, 68-85, 88-90, 97-104 and 112-124 is/are rejected.
- 7) ☒ Claim(s) 33, 38 and 105-111 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 April 1996 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☒ Certified copies of the priority documents have been received in Application No. 08/466,068.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
- Paper No(s)/Mail Date 10/18/05, 6/17/05.

- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☒ Other: IDS 6/2/05, 4/27/05, 9/4/03.

DETAILED ACTION

Continued Examination

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after allowance or after an Office action under *Ex Parte Quayle*, 25 USPQ 74, 453 O.G. 213 (Comm'r Pat. 1935). Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, prosecution in this application has been reopened pursuant to 37 CFR 1.114. Applicant's submissions filed on 27 April 2005, 2 June 2005, 17 June 2005, and 18 October 2005 have been entered.

Specification

2. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

Drawings

3. Figure 8 should be designated by a legend such as --Related Art-- or --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the

applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Information Disclosure Statement

4. The information disclosure statement filed on 18 October 2005 lists references which are not available to the examiner, either in the parent cases or in the present (electronic) file. These references have not been considered and have been lined through. If the applicant wishes for them to be considered, the examiner requires a copy of these references to be supplied by the applicant.

Claim Objections

5. The examiner notes that he is using the listing of claims from the Appeals Brief filed on 28 February 2002.
6. Claim 81 is objected to because of the following informalities: it depends on claim 36 which has been cancelled (or is missing). It is assumed that it is meant to depend on claim 20. Appropriate correction is required.

Claim Rejections - 35 USC § 112

7. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

8. Claim 88 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Where is support for this limitation found in the original specification?

9. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

10. Claim 49 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

It is unclear to the examiner which axes are "the axes of switching-effective twisting of the liquid crystal molecules". For examining purposes, it is assumed the single axis around which the twist occurs is meant.

11. Claim 82 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

It is unclear to the examiner what is meant by "direct triggering device". For examining purposes, it is assumed that one of a TFT switching element and a passive matrix driving setup satisfies this limitation.

12. Claim 89 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The claim recites "has an initial state configuration ... which reduces domain formation ... and/or which imparts ... a small viewing angle dependence and a correspondingly improved image contrast". Reduces with respect to what? Improved with respect to what? In claims 84 and 85, it is clear that the reduction or improvement is in comparison to the device when other values of α_o and/or β_o are chosen. Here, given a prior art device, it is unclear what to compare it to, to see if a reduction or improvement has occurred. Also, in the phrase "small viewing angle dependence", the term "small" is a term of degree which is understood to mean smaller than in the device being compared to; in claim 89, where it is not clear what is being compared, the scope of "small viewing angle dependence" becomes unclear. For examining purposes, it is assumed that any viewing angle dependence will be "small" compared to some other device.

Claim Rejections - 35 USC § 102

13. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

14. Claim 90 is rejected under 35 U.S.C. 102(b) as being anticipated by *Soref*, "Field effects in nematic liquid crystals obtained with interdigital electrodes", *Journal of Applied Physics*, vol. 45, no. 12, (1974).

Soref discloses [see Figs. 1 and 3, for instance] a liquid crystal switching element comprising a liquid crystal layer comprising liquid crystal molecules and having a surface for display of an image which is switched under control of an electric field having a component predominantly parallel to said surface, wherein said liquid crystal molecules have a pretilt angle $\alpha_o = 0^\circ$ ["initially oriented parallel to the plates", see p. 5467, and this is within the recited range of $0^\circ \leq \alpha_o < 30^\circ$], and an orientation angle β_o such that $0^\circ < \beta_o < 90^\circ$ [β_o is labeled θ_A in Fig. 3]. Claim 90 is therefore anticipated.

15. Claim 89 is rejected under 35 U.S.C. 102(b) as being anticipated by *Nakanowatari*, Japanese Patent Document No. 01-120528.

Nakanowatari discloses an electro-optical display device comprising a liquid crystal layer comprising liquid crystal molecules and having a surface for display of an image which is switched under control of an electrode field having a component predominantly parallel to said surface, wherein said liquid crystal molecules are in homogeneous alignment and said device has an initial state configuration in the absence of electric field which during operation reduces domain formation in said image and/or which imparts to said image a small viewing angle dependence and a correspondingly improved image contrast [the electrode and liquid crystal configuration which provides high contrast, etc.; see the abstract and the translation provided by the applicant, for instance]. Claim 89 is therefore anticipated.

16. Claims 84 and 85 are rejected under 35 U.S.C. 102(b) as being anticipated by *Soref*, "Interdigital Twisted-Nematic Displays", Proceedings of the IEEE, pp. 1710-1711, (1974) [hereinafter *Soref-IEEE*].

Soref-IEEE discloses an electro-optical display device comprising a liquid crystal layer comprising liquid crystal molecules and having a surface for display of an image which is switched under control of an electrode field having a component predominantly parallel to said surface, wherein said liquid crystal molecules are in homogeneous alignment and have a pretilt angle α_o [0° , since the liquid crystal molecules are parallel to the surface] and an orientation angle β_o [referred to as θ in the reference] which prevent or reduce domain formation in said image and/or which imparts to said image a small viewing angle dependence and a correspondingly improved image contrast [the reference discusses varying θ (that is, β_o) to produce higher contrast in accordance with a $\sin 2\theta$ theory, in which the optimal contrast occurs at $\beta_o = 0^\circ$ or 90°]. Claims 84 and 85 are therefore anticipated.

Claim Rejections - 35 USC § 103

17. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

18. Claims 20-32, 34, 35, 39, 40, 42-62, 68-80, 82, 83, and 112-119 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Soref*, "Field effects in nematic

liquid crystals obtained with interdigital electrodes", Journal of Applied Physics, vol. 45, no. 12, pp. 5466-5468, (1974) in view of official notice.

Soref discloses [see Figs. 1 and 3, for instance] an electro-optical display device comprising a liquid crystal switching element which comprises a liquid crystal layer comprising liquid crystal molecules and having a surface for display of an image which is switched under control of an electric field having a component predominantly parallel to said surface, wherein said liquid crystal molecules have a pretilt angle $\alpha_o = 0^\circ$ ["initially oriented parallel to the plates", see p. 5467, and this is within the recited range of $0^\circ \leq \alpha_o < 30^\circ$], and an orientation angle β_o such that $0^\circ < \beta_o < 90^\circ$ [β_o is labeled θ_A in Fig. 3].

Soref does not disclose a plurality of such switching elements; instead it discloses only a single on-off switching element (note that the claimed "switching element" should be thought of as an LCD pixel, rather than as a TFT, for instance). The examiner takes official notice that it would have been obvious to one of ordinary skill in the art at the time of the invention to form a plurality of such switching elements in the display device, motivated by the desire to having a plurality of pixels which can thereby form a useful image. Claim 20 is therefore unpatentable.

The value $\alpha_o = 0^\circ$ satisfies the ranges recited in claims 21-27, 34, and 35, so these are also unpatentable. The value $\alpha_o = 0^\circ$ abuts the ranges recited in claims 28-32, such that one of ordinary skill in the art would expect $\alpha_o = 0^\circ$ and α_o just barely larger than 0° to have the same properties, so a *prima facie* case of obviousness exists [see MPEP 2144.05]; claims 28-32 are therefore unpatentable.

As shown in the top of Fig. 3, the liquid crystal layer can have an twisted structure in its initial orientation which can be untwisted by the field component aligned predominantly parallel to the liquid crystal layer, so claims 39, 112-118 are also unpatentable. There is liquid crystal molecules which are twistable, a substrate, and an electrode structure as recited, so claim 40 is also unpatentable. There is a polarizer and a voltage source, so claims 42, 43, 71, 74, and 75 are also unpatentable. There is an analyzer, so claims 47 and 72 are also unpatentable. The axis of switching-effective twisting of the liquid crystal molecules [see 35 USC 112 above] is substantially perpendicular to the plane of the substrate, so claim 49 is also unpatentable. Within the image spot of the liquid crystal switching element, the electrode structure is formed between the substrate and the liquid crystal layer and has at least one pair of electrodes with a space therebetween, so claim 50 is also unpatentable. Each pair of electrodes comprises strip- or line-type electrodes which extend to make a space between them, so claim 51 is also unpatentable. The electrodes intermesh in comb fashion, so claim 52 is unpatentable. The space between the pair of electrodes is 15 μm , so claim 53 is also unpatentable. The applied voltage is $\sim 10\text{V}_{\text{rms}}$, so claim 54 is also unpatentable. The thickness of the liquid crystal is 1.5-3 μm , so claim 55 is also unpatentable. The electrode structure is located in one plane, so claim 62 is also unpatentable. The switching elements would comprise a multiplicity of pixels, so claim 68 is also unpatentable. The liquid crystal is nematic, so claim 46 is also unpatentable.

The examiner takes official notice that it would have been obvious to one of ordinary skill in the art at the time of the invention to have the area of the image spots

(pixels) be $10\ \mu\text{m}^2$ to $1\ \text{mm}^2$, motivated by the desire to be able to create high resolution images, so claim 56 is also unpatentable. Similarly, to arrange in an active matrix, thin film transistor matrix, would have been obvious to one of ordinary skill in the art at the time of the invention in order to obtain good image quality, so claims 57, 58, 61, 76, 77, and 82 are also unpatentable. Similarly, it would have been obvious to one of ordinary skill in the art at the time of the invention to use the time multiplex method, and alter brightness and/or color of the pixels, to obtain a good display by standard driving methods, so claims 59, 60, 82, and 83 are also unpatentable. The examiner also takes official notice that having the initial orientation of liquid crystal molecules along the polarizer and having the polarizer and analyzer parallel or perpendicular is well known [as an aside, this is made explicit in *Soref-IEEE*], and it would have been obvious to one of ordinary skill in the art at the time of the invention to arrange them so, motivated by the desire to control the light polarizations using the conventional arrangement, so claim 69 is unpatentable. Having the liquid crystal molecules perpendicular to the polarizer is an art-recognized equivalent, so claim 70 is also unpatentable. Similarly, the examiner takes official notice that positive retardation ($\Delta n d$) less than 4λ , using dichroic dyes and polymer in the liquid crystal, and birefringent optical compensation were well-known, and would have been obvious to one of ordinary skill in the art at the time of the invention either due to conventionality, to improve the display quality, or produce certain types of LCDs with known advantages; claims 48, 73, and 78-80 are therefore unpatentable.

Soref appears not to disclose an orientation layer aligning the liquid crystal molecules. The examiner takes official notice that it would have been obvious to one of ordinary skill in the art at the time of the invention to use an orientation layer to align the liquid crystal molecules, motivated by the desire to ensure the desired initial orientation of the liquid crystal molecules. All the limitations of claim 44, 45, and 119 are therefore met, so these claims are unpatentable as well.

19. Claims 37, 41, 81, 97-104, and 120-124 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Soref*, "Field effects in nematic liquid crystals obtained with interdigital electrodes", *Journal of Applied Physics*, vol. 45, no. 12, pp. 5466-5468, (1974) in view of official notice as applied above, and further in view of *Soref*, "Interdigital Twisted-Nematic Displays", *Proceedings of the IEEE*, pp. 1710-1711, (1974) [hereinafter *Soref-IEEE*].

Soref does not disclose the particular angle β_0 shown in Fig. 3. In the absence of specific arguments that the claimed ranges of β_0 have unexpected advantages over values, the examiner relies on the evidence of *Soref-IEEE* that "[in] general, the nematic director at the electroded plate can have an arbitrary orientation in the xy plane". The different possible values of β_0 are therefore considered art-recognized equivalents, so claims 37, 41, 81, 97-104, and 120-124 are therefore unpatentable.

Allowable Subject Matter

20. Claims 33, 38, and 105-111 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
21. Claims 63-67 are allowed.
22. The following is a statement of reasons for the indication of allowable subject matter:

The prior art does not disclose the device of claim 33, in particular the additional limitation that α_0 is about 5° . (This is sufficiently different from 0° to distinguish it from *Soref*.) Claim 33 would therefore be allowable if rewritten appropriately.

The prior art does not disclose the device of claim 63, in particular the additional limitation that the electrode structure is arranged alternately in at least two different planes in parallel with the substrate. Claim 63 is therefore allowed, as are its dependent claims 64-67.

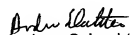
The prior art does not disclose the device of claims 38 and 105-111, in particular the additional limitation that the liquid crystal layer has an untwisted structure in its initial orientation and can be reoriented to a twisted structure by the parallel field component. (*Soref's* electric field causes the liquid crystal across the entire layer to orient along the electric field as shown in the bottom of Fig. 3, not to form a twisted structure.) Claims 38 and 105-111 would therefore be allowable if rewritten appropriately.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew Schechter whose telephone number is (571) 272-2302. The examiner can normally be reached on Monday - Friday, 9:00 - 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dave Nelms can be reached at (571) 272-1787. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Andrew Schechter
Primary Examiner
Technology Center 2800
8 July 2006